WHAT IS CLAIMED IS:

1.   A carrier medium comprising program instructions executable to implement the method of:

5

determining an ordering for a plurality of N nodes such that the nodes are circularly ordered as nodes D_0, D_1, D_2, ... D_{N-1};

each node D_i in the plurality of nodes establishing a link to X other nodes
10   chosen as nodes D_{i+1}, D_{i+2}, ... D_{i+X}, wrapping to D_0 if necessary; and

each node D_j in at least a subset of the plurality of nodes establishing a link with one or more additional chosen nodes not in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X}.

15

2.   The carrier medium of claim 1, wherein the method implemented by the program instructions further comprises:
       for each node D_j in the at least the subset, each node in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X} establishing a link with the one or more additional nodes chosen
20   by the node D_j.

3.   The carrier medium of claim 1,
       wherein said each node D_j in the at least the subset establishing a link with one or more additional chosen nodes not in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X}
25   comprises each node D_j in the at least the subset establishing a link with one or more randomly chosen nodes not in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X}.

4.   The carrier medium of claim 3,

wherein said each node D_j in the at least the subset establishing a link with one or more randomly chosen nodes comprises each node D_j in the at least the subset establishing a link with exactly one randomly chosen node.

5   5.   The carrier medium of claim 1,

wherein the plurality of nodes utilize the established links to communicate in a peer-to-peer manner.

6.   The carrier medium of claim 1,

10   wherein the nodes are circularly ordered so that node D_{N-1} follows node D_0 in the ordering.

7.   The carrier medium of claim 1,

wherein the at least the subset includes nodes whose position in the ordering is

15   a multiple of 2X.

8.   The carrier medium of claim 1,

wherein X is substantially smaller than N.

20   9.   The carrier medium of claim 1,

wherein each node in the plurality of nodes has a unique node ID;

wherein said determining the ordering comprises determining an ordering based on the node IDs.

25   10.   The carrier medium of claim 9,

wherein the node IDs are capable of being ordered;

wherein said determining the ordering based on the node IDs comprises ordering the node IDs;

wherein the node with the first node ID in the ordering is selected as node D_0, wherein the node with the second node ID in the ordering is selected as node D_1, and so on, up to the node with the highest node ID in the ordering being selected as node D_{N-1}.

5   11.   The carrier medium of claim 1,

wherein each link between two nodes comprises a virtual communication channel between the two nodes.

        12.   The carrier medium of claim 1,

10   wherein the established links comprise one or more TCP links and/or one or more UDP links.

        13.   The carrier medium of claim 1,

wherein the plurality of nodes are interconnected in a local area network

15   (LAN).

        14.   The carrier medium of claim 1, wherein the method implemented by the program instructions further comprises:

        one or more nodes in the plurality of nodes establishing one or more additional

20   links to one or more other nodes.

        15.   The carrier medium of claim 1,

wherein the established links enable a message to be routed from any given first node to any given second node with an average efficiency on the order of log(N)

25   message hops.

        16.   The carrier medium of claim 1,

wherein the established links enable recovery operations to be performed in the event of node failures with an average efficiency on the order of 3 message hops or less.

30

17.   A carrier medium comprising program instructions executable to implement the method of:

determining an ordering for a plurality of N nodes such that the nodes are circularly ordered as nodes D_0, D_1, D_2, ... D_{N-1};

each node D_i in the plurality of nodes establishing a link to X other nodes chosen as D_{i+1}, D_{i+2}, ... D_{i+X}, wrapping to D_0 if necessary; and

for each node D_j in at least a subset of the plurality of nodes:

the node D_j establishing a link with one or more randomly chosen nodes not in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X};

each node in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X} establishing a link with the one or more nodes randomly chosen by the node D_j.

18.   A carrier medium comprising program instructions executable to implement the method of:

determining an ordering for a plurality of nodes such that the ordering has a first node, a second node, and so on, up to a last node, wherein the ordering is circular so that the first node follows the last node in the ordering;

each node establishing one or more links to one or more nodes immediately following the node in the ordering; and

for at least a subset of nodes, each node in the subset establishing one or more links to one or more randomly chosen nodes.

19.   A system comprising:

a network;

a plurality of N nodes coupled via the network;

wherein each node is operable to determine an ordering for the plurality of N nodes such that the nodes are circularly ordered as nodes D_0, D_1, D_2, ... D_{N-1};

5   wherein each node D_i in the plurality of nodes is operable to establish a link to X other nodes chosen as nodes D_{i+1}, D_{i+2}, ... D_{i+X}, wrapping to D_0 if necessary; and

wherein each node D_j in at least a subset of the plurality of nodes is operable to establish a link with one or more additional chosen nodes not in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X}.

10

20.   The system of claim 19,

wherein for each node D_j in the at least the subset, each node in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X} is operable to establish a link with the one or more

15   additional nodes chosen by the node D_j.

21.   The system of claim 19,

wherein said each node D_j in the at least the subset establishing a link with one or more additional chosen nodes not in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X}

20   comprises each node D_j in the at least the subset establishing a link with one or more randomly chosen nodes not in the set D_{j-X}, D_{j-X+1}, ... D_{j-1}, D_{j+1}, D_{j+2}, ...D_{j+X}.

22.   The system of claim 21,

wherein said each node D_j in the at least the subset establishing a link with one

25   or more randomly chosen nodes comprises each node D_j in the at least the subset establishing a link with exactly one randomly chosen node.

23.   The system of claim 19,

wherein the plurality of nodes are operable to utilize the established links to

30   communicate in a peer-to-peer manner.

24.   The system of claim 19,

wherein the at least the subset includes nodes whose position in the ordering is a multiple of 2X.

5

25.   The system of claim 19,

wherein X is substantially smaller than N.

26.   The system of claim 19,

10   wherein each node in the plurality of nodes has a unique node ID;

wherein said determining the ordering comprises determining an ordering based on the node IDs.

27.   The system of claim 19,

15   wherein each link between two nodes comprises a virtual communication channel between the two nodes.

28.   The system of claim 19,

wherein the network comprises a a local area network (LAN), wherein the

20   LAN interconnects the plurality of nodes.

29.   The system of claim 19,

wherein one or more nodes in the plurality of nodes are operable to establish one or more additional links to one or more other nodes.

25